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Taxonomy and geographic distribution of a northwestern Venezuelan toad (Anura, Bufonidae, *Bufo sternosignatus*)

Enrique LA MARCA * & Abraham MIJARES-URRUTIA **

* Laboratorio de Biogeografía, Escuela de Geografía, Facultad de Ciencias Forestales,
Universidad de Los Andes, Apartado 116, Mérida 5101-A, Venezuela

** Centro de Investigaciones en Ecología y Zonas Áridas (CIEZA),
Universidad Francisco de Miranda, Apartado Postal 7506, Coro 4101-A, Venezuela

In this paper we provide a redescription of *Bufo sternosignatus*, a northwestern Venezuelan toad usually associated with the "*Bufo typhonius* complex", and detailed data on its external morphology, skin, meristic characters, pattern of coloration in life and after preservation, and biogeography.

INTRODUCTION

Bufo sternosignatus was described by Albert GÜNTHER (1859) in a book dealing with the anurans deposited in the collection of the British Museum of Natural History (London). The type series included a male and a female from "Venezuela", a female from "Puerto Cabello" (Estado Carabobo, Venezuela), and two Mexican juvenile toads stated as coming from "Mexico" and "Cordova". The latter were considered by BOULENGER (1882: 320) as *Bufo valliceps* Wiegmann, 1833, a decision followed by KELLOGG (1932: 68). The treatment of *Bufo sternosignatus* as a junior synonym of *Bufo valliceps* by PORTER (1964: 242) probably reflects this partial assignment, inasmuch as BOULENGER (1882) restricted the name to the Venezuelan types, although PORTER (1964) did not do this. BOULENGER (1882: 323) also assigned to *B. sternosignatus* two specimens coming from



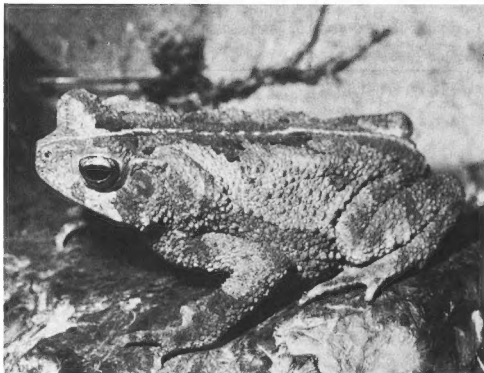


Fig. 1. — *Bufo sternosignatus*, ULABG 1924, adult female, SVL 48.6 mm.

“Bogotá” (Colombia). Two other records from Colombia, Cafetal Amelia, near Angelópolis, 1820 m, by PERACCA (1914), and Cañón de Tolima, by WERNER (1916), were denied by RIVERO (1961: 29), who considered them as probably referring to *Bufo typhonius alatus*. COCHRAN & GOIN (1970: 112) retained the Bogotá frog in the Colombian fauna, “on the strength of BOULENGER’s identification”.

The specific status of *Bufo sternosignatus* was apparently not questioned until SHREVE (1947) treated it as a subspecies of *Bufo typhonius*, with the provision that “even though *Bufo typhonius alatus* Thomassinot, 1884 from Panama should prove to be synonymous, *sternosignatus*, being the older name, will have to be used”. RIVERO (1961: 28-29) considered the species to be very similar to *Bufo typhonius alatus*, adding that it “perhaps interbreeds (though not freely) in part or all of its range”, and later (RIVERO, 1964b: 314) that they “seemed to be most closely related”. All other references to the species in the literature have appeared in catalogues or locality lists under *Bufo sternosignatus* (e.g. LUTZ, 1927a-b, 1955; PARKER, 1935; SHREVE, 1947; SMITH & TAYLOR, 1950; GINÉS, 1959; RIVERO, 1964a-b, 1967; SOLANO, 1969; MÜLLER, 1973; LYNCH, 1979; HARDING, 1983; FROST, 1985; LA MARCA, 1992a, 1995).

Bufo sternosignatus was placed in the *Bufo typhonius* group by CEI (1972) and as such it is still recognized. The most recent grouping of South American bufonids (by DUELLMAN

& SCHÜLTE, 1992) placed the species in the *typhonius* group along with the following species: *B. ceratophrys* Boulenger, 1882; *B. dapsilis* Myers & Carvalho, 1945; *B. iserni* (Jiménez de La Espada, 1875); *B. nasicus* Werner, 1903; *B. roqueanus* Melin, 1941; and *B. typhonius* (Linnaeus, 1758). HOOGMOED (1989) was of the opinion that even those species do not form a natural group and recommended that the name *Bufo typhonius* be suppressed, because of nomenclatural problems and the confusion surrounding this name. Regarding *B. sternosignatus*, CEI (1972) had otherwise indicated that "it might alternatively be related to *B. granulatus*". The systematic status of *B. sternosignatus* remains problematic, as was pointed out by HOOGMOED (1990), who also indicated that "statements about relationship seem to have been made on the basis of general appearance (colour and pattern) and not on any hard morphological data". After examining the Venezuelan syntypes, HOOGMOED (1990) concluded that these certainly were not *Bufo valliceps*, that they were not related to *Bufo granulatus* either, and did not rule out the possibility that the species is identical to *B. "typhonius"* from Panama and adjacent North America.

Although relatively easy to set apart from other Venezuelan bufonids, *Bufo sternosignatus* (fig. 1) has not been properly studied, probably due to the paucity of specimens in collections. We had the opportunity to collect the species in the field, and from the examination of these and other museum specimens we conclude that, although it shares the pale vertebral line and a so-called "dead-leaf pattern" with some species in the "*typhonius* group", it is a perfectly valid and distinct taxon probably not related to any species in this complex. We do not rule out the possibility that it might be related to *Bufo granulatus*. *Bufo sternosignatus* is readily distinguished from other northern South American bufonids by being more spinose, by having very distinct tympana, oval-shaped spinose parotoid glands, a pale cross design on ventral surfaces, and by the tubercles on flanks disposed in lateral rows running somewhat parallel to the dorsum. Although the type locality of *Bufo sternosignatus* was restricted by COCHRAN & GOIN (1970: 111) to "Puerto Cabello, Venezuela", which "almost" amounts to a lectotype designation, no proper such designation has ever been published for this species. Unfortunately, we could not study the syntypes, nor could we designate a lectotype, an action we feel needs to be done in the frame of a revisionary work on the systematic relationships of the species, a task beyond the scope of this paper. Nonetheless, we offer here a redescription and additional data on the species, in the hope that they may help for such a revisionary work.

MATERIAL AND METHODS

Museum abbreviations employed in the text are as follows: CIEZAH, Colección Herpetológica del Centro de Investigaciones en Ecología y Zonas Áridas, Universidad Francisco de Miranda, Venezuela; CVULA, Colección de Vertebrados, Universidad de Los Andes, Venezuela; MCNG, Museo de Ciencias Naturales Guanare, Venezuela; ULABG, Colección de Anfibios y Reptiles, Instituto de Geografía, Universidad de Los Andes, Venezuela; UMMZ, University of Michigan Museum of Zoology, USA.

The following specimens of *Bufo sternosignatus*, all new records from Venezuela, and upon which is based the redescription of the species, were examined during the course of this study:

Estado Aragua: ULABG 3947, La Trilla, near Ocumare de La Costa, 150 m. Estado Barinas: CVULA 5158, Barinitas. Estado Carabobo: ULABG 1319, Hacienda Bucarito, near Montalbán, 700 m. Estado Falcón: CIEZAH 322, road to Cerro Galicia, near Curimagua, 1150 m; MCNG 2190-2191, Finca La Felipina, approx. 3 km from La Soledad de Uria, Sierra de San Luis, ca. 1300 m; CIEZAH 323, CVULA 5118-5119, Cataratas de El Hueque, Parque Nacional J. C. Falcón, Sierra de San Luis, 800 m; CIEZAH 317-319, San Diego, Sierra de San Luis, approx. 1100 m; ULABG 2940, Cerro Chichiriviche. Estado Portuguesa: ULABG 3726-3727, 6 km from Río Saguaz, on road Biscucuy-Chabasquén, 585 m. Estado Trujillo: ULABG 1924, carretera Boconó-Trujillo, near intersection with road Trujillo-La Concepción; ULABG 2667, Agua Negra near Sabaneta, 1405 m, on road from Trujillo to San Lázaro.

Terminology, measurements and web formula system follow LA MARCA (1984, 1989, 1994b).

REDESCRIPTION OF *BUFO STERNOSIGNATUS* GÜNTHER, 1859

DIAGNOSIS AND DEFINITION

A moderate-sized species of *Bufo* (mean SVL: 5 males, 49.5 mm; 5 females, 42.3 mm) having the following combination of characters: (1) distinct supraorbital and anteorbital crests bordering upper eyelid and anterior part of eye; (2) supratympanic crest prominent; (3) parotoid glands oval-shaped and densely tuberculate; (4) snout truncated in dorsal view; (5) tympanum large (about 2/3 the horizontal length of eye); (6) skin densely tubercular with numerous minute spicules; (7) a pale-cream cross usually present on chest.

Bufo sternosignatus occurs sympatrically with *B. marinus*, but may be distinguished by the following characters (in *B. sternosignatus*): smaller size, shorter head, smaller tympanum, stronger supratympanic crest, snout truncated in dorsal view, and body surfaces bearing minute spicules. *B. sternosignatus* more closely resembles *B. typhonius alatus*, but differs by having a non-prominent snout, less prominent supraorbital crest, weak occipital crest, parotoid glands oval-shaped, hands and feet with minute spicules, metatarsal fold absent, and a pale-cream cross usually present on chest. *B. sternosignatus* could also be confused with *B. granulosus*, but differs from the latter by having a larger size, longer head, stronger supratympanic crest, smaller spicules on hand and feet, more truncated snout, crests around nostrils absent, and no well-defined crest along canthus rostralis.

DESCRIPTION

Head twice as long as wide and twice as wide as deep, narrower than body width; top of head flat to slightly concave in the middle, shifting to slightly convex in the postoccipital region, with prominent warts (ca. 0.5 mm in diameter), some of them coalescing to form canthus rostralis. Canthus rostralis curved, well defined. Distinct supraorbital and anteorbital crests bordering upper eyelid and anterior part of eye. Loreal region slightly

concave, descending almost vertically to upper lip; snout truncated in dorsal view, slightly protruding (sensu HEYER et al., 1990: fig. 80) in lateral view; nares oval to rounded, directed dorsolaterally; nostrils elevated, closer to tip of snout than to eye (about 1/5 of distance from point of snout to eye); internarial distance about half interorbital distance. Internarial region between moderate to highly concave. Interorbital distance slightly (approx. 1/5) longer than upper eyelid width. Upper eyelid bearing pungent tubercles. Upper eyelid with a thickened and finely granular border. External border of upper eyelid with minute spicules, slightly projecting beyond eye. Lips not flaring. Eyes protuberant to the sides and above dorsal surface of head. Eye diameter slightly longer than distance from anterior border of eye to naris opening. Lower eyelid translucent (opaque in CIEZAH 323). Palpebral membrane dusted with brown, with a well defined dark brown border. Pupil oval. Temporal region descending vertically. Supratympanic crest moderately to well defined, fleshy, not projecting over temporal region, from posterior border of eye to anterior or medial part of parotoid gland, with smooth borders, not covering tympanum. Tympanum large (horizontal length about 2/3 of horizontal length of eye), conspicuous, rounded to oval, bordered by tubercles, with well-defined elevated borders, and without cartilaginous ring. Supratympanic crest prominent, short and thick, not projecting laterally beyond most external border of upper eyelid, extending with a narrow crest descending almost vertically, bordering tympanum anteriorly; supratympanic crest connected anteriorly with a crest that borders upper eyelids and anterior part of eye. Parotoids oval-shaped, well visible from above, slightly swollen, about twice as long as wide, 1.5 to 2 times larger than width of upper eyelid.

Choanae rounded to oval, large (about 2/3 of internarial distance), located near the margins of roof of mouth, covered or not by palatal shelf of maxillary arch, separated by a distance larger than that between nostrils. Tongue oval, narrow (width about 1/3 of length), with parallel margins; tongue entire in its anterior part, almost completely free (more than 2/3 of its posterior part); teeth absent from maxilla, premaxilla and vomers. Males with lateral vocal slits, at about 40 % of distance from base to tip of tongue, and a possible subgular vocal sac (see below).

Cloacal opening located at or close to midlevel of thighs. Cloacal opening small, directed posteroventrally, at about 2/3 of distance from base to top of thigh. Ulnar fold absent. Hand (fig. 2) with outer metacarpal (palmar) tubercle well defined, large, not divided, slightly heart-shaped; inner metacarpal (thenar) tubercle moderately to well visible, small, about 1/4 to 1/2 size of palmar (sometimes inconspicuous), oval. Supernumerary tubercles present, relatively rounded to squared, of small to very small size. Subarticular tubercles double, rounded, small, conspicuous. Fingers without lateral fringes; fingers almost completely free, except for a short and thick membrane between fingers III and IV; hand web formula I 0 - 0 II 0 - 0 III 1 - 1 IV 0 - 0 V; membrane thick, rugose, tuberculate. Tip of fingers rounded. Digital pads narrower than maximum width of fingers. Relative length of fingers I \geq II < III > IV.

Foreleg with numerous small tubercles, some pungent. Tarsal fold absent; narrow groove dividing tarsus longitudinally, from base of fingers IV and V to tibio-tarsal joint. Foot (fig. 3) with an inner metatarsal tubercle prominent, flattened, smooth, oval, slightly elongate in dorsal view, subconical in lateral view, 2.5 times larger than outer metatarsal

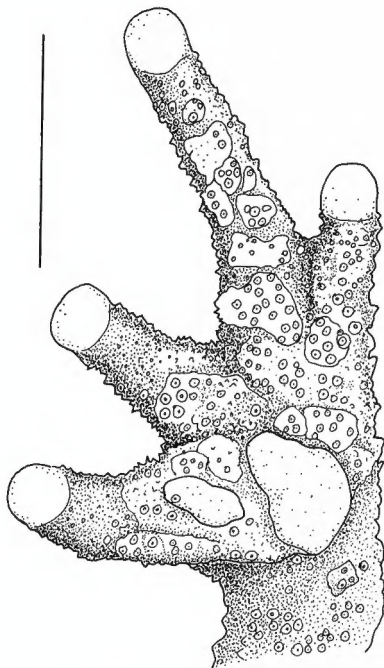


Fig. 2. - Left hand of *Bufo sternosignatus*, ULABG 1319. Note the numerous minute spicules on skin. Line: 5 mm.

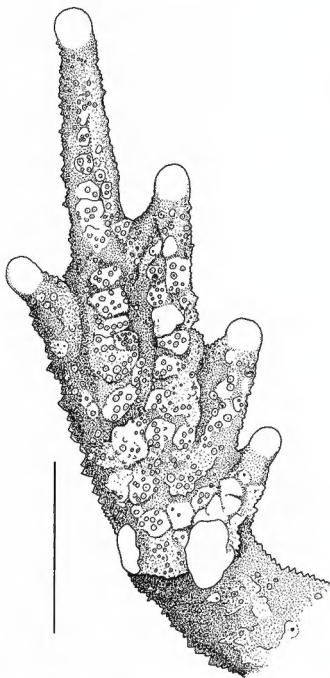


Fig. 3. — Right foot of *Bufo sternosignatus*, ULABG 1319. Line: 5 mm.

tubercle, about twice as long as wide. Outer metatarsal tubercle twice as long as wide, smaller than inner metatarsal tubercle, distinct, oval in dorsal view, prominent, flat and smooth. Supernumerary tubercles present, small to medium-sized, with minute spicules. Subarticular tubercles conspicuous, small and oval-shaped. Toe IV with a lateral tuberculate fringe; toe tips rounded; thick tuberculate membrane between toes; maximum web development reaching base of digital pads on left side of toes I, II and III, and right side of V; fourth toe almost completely free; web formula I 1 - 2 II 2 - 2.5 III 2 - 2 IV 1.5 - 1 V; all toes bearing a lateral fringe-like row of tubercles that are a continuation of those on free border of interdigital membrane. Heels not touching or only slightly so when thighs are held at right angles to body axis; tibio-tarsal articulation reaching shoulders when legs are adpressed forward (in the original description, heel is stated to reach eye; in MCNG 2191, heel reaches tympanum; in CIEZAH 318, it reaches between tympanum and shoulder). Relative length of toes: I < II < V < III < IV. Tibia about 37 % body length.

Large cream eggs (up to 1.4 mm diameter) were found in convoluted oviducts of adult females ULABG 1319 and 2406, and (up to 1.9 mm) in CIEZAH 319. Adult males have elongate white testicles (e.g. CIEZAH 317-318), sometimes granulate (e.g. CIEZAH 323); vocal sac is not evident, possibly subgular. Vocal slits may be present on one (e.g. CIEZAH 323) or both sides (e.g. CIEZAH 318). Adult males CIEZAH 317-318 have anterodorsal parts of fingers I and II partially keratinized.

Skin

Skin of dorsum, flanks, throat, venter, extremities (above and below), palms and soles tubercular. Tubercles on dorsum and on top of head between rounded and pungent, from 0.5 to 1.5 mm in diameter, the largest on sides and posterior part of body; a stria longitudinally dividing upper head and body in two equal halves, from snout tip to urostyle or upper border of cloacal opening. Lower back and flank tubercles sometimes ending in one or several (up to 8) spicules. Parotoid glands densely tuberculate. A row of tubercles (sometimes inconspicuous), medium to large-sized, conical shaped, from parotoids to groin; largest tubercles in middle of row. Loreal region with tubercles bearing numerous minute spicules. Upper eyelid with numerous subconical tubercles; those on external border ending in spicules. Temporal region and area near rictus covered by numerous round tubercles, small to moderate-sized. Tympanum densely granular, granules rounded, minute. Tubercles rounded and long (about 1.0 mm long) between upper part of tympanum and supratympanic crest. Neck, in lateral view, with numerous, relatively medium-sized, tubercles in its superior part; scarce and small in its inferior part. Flanks with rounded tubercles, moderate-sized, some pungent.

Venter and throat with small (about 1.0 mm) tubercles, ending in numerous minute spicules; cloacal opening smooth or bordered by rounded tubercles bearing numerous spicules. Tubercles on extremities elevated, subconical, smaller than those on dorsum, generally ending in a single spicule; lower aspect of forearm usually with large subconical tubercles, arranged in two or three longitudinal rows; a longitudinal groove, slightly oblique, from wrist to elbow; fingers totally spiculate, except on distal end, which is smooth; interdigital membranes tuberculate; supernumerary and subarticular hand

tubercles bearing numerous minute pungent spicules. Inner metacarpal tubercle smooth or occasionally with minute spicules. Free margin of hand-web with some minute acute tubercles. Subarticular tubercles on feet with numerous minute spicules.

Measurements in mm (mean \pm one standard deviation)

Snout-to-vent length: adult males, 49.5 ± 3.3 (N = 5, range 45.7-55.1); females, 42.3 ± 3.4 (N = 5, range 37.1-47.6). Other measurements (N = 14, both sexes together): head width, 15.1 ± 2.0 ; head length, 12.4 ± 1.5 ; eye, 4.5 ± 0.6 ; eye to tip of snout distance, 5.5 ± 0.6 ; eye to nostril distance, 3.8 ± 0.6 ; internarial distance, 2.9 ± 0.4 , interorbital distance, 5.2 ± 0.8 ; eye to tympanum distance, 1.4 ± 0.4 ; horizontal length of tympanum, 2.6 ± 0.4 ; hand length, 9.9 ± 1.3 ; foot length, 14.8 ± 2.1 ; tibia length, 15.9 ± 2.2 .

Coloration

Patterns of dorsal and ventral coloration for the species have been illustrated by GÜNTHER (1859: plate 5, fig C) and LUTZ (1927a, plate 8, figs. 3-4). RIVERO (1961: 28) noted that this frog is usually of a reddish colour when alive, and that some specimens are peculiarly marked with yellow and brown below. Data on coloration in life is available for ULABG 1924 (fig. 1) and 3726-3727. Dorsum pale brown bearing a large irregular dark brown to black marking bordered with a pale yellowish line; a cream line from point of snout to end of urostyle; inferior part of flanks dark brown; forearms and thighs with chocolate bands; throat and chest cream; a dirty-cream cross-shaped marking on dark gray chest; upper part of flanks pale brown; lower parts of flanks chocolate. Tympanum marbled with chocolate and dark brown. Numerous cream tubercles, on a plumbeous background, on venter and under the thighs, and two irregular white spots on rear end of upper lip, connected to a white blotch below eye (ULABG 1924). Golden iris, marbled with brown in inferior half, parotoid glands ochre to pale brown, upper lip cream, inconspicuously barred, and groin ochre with a pinkish hue (ULABG 3726-3727). Colour slides of ULABG 1319 (fig. 4) show lower dorsum and cephalic irregular black spots, and a butterfly-shaped dark brown to black marking between eyelids, all bordered with yellow lines. Digits, proximal end of ventral surface of the thighs and axillary surfaces ochre-reddish. Vertebral line, cross on ventral surfaces, lower venter, most parts of ventral parts of thighs and shanks dirty white. Two white spots present at the rear end of upper mandible.

Coloration of preserved specimens is detailed as follows. Dorsum from pale to dark brown, usually with a pale vertebral line, sometimes bordered by black, from point of snout to urostyle, sometimes hidden by a pale brown marking between the eyes. Some specimens bearing dark-brown, bilaterally symmetrical or almost symmetrical markings, on a pale brown background, these markings having sometimes a blackened border (e.g. ULABG 1924); some specimens with dark-brown rounded markings, bordered by a pale cream line at level of sacrum (e.g. CIEZAH 317, CVULA 1319). Some specimens (e.g. CIEZAH 318) with pale brown tubercles surrounded by black, and some (e.g. CIEZAH 319 and 322, CVULA 5119, MCNG 2190-2191, ULABG 2940) with a dorsal pale brown subtriangular marking, surrounded by black, with apex directed backwards. All specimens

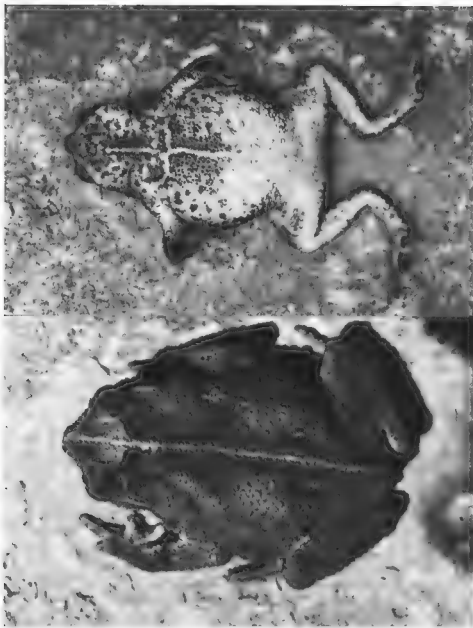


Fig. 4. - *Bufo sternosignatus*, ULABG 1319, adult female, SVL 55.1 mm. Bottom: dorsal view (note pale vertebral line and dark dorsal markings). Top: ventral view (note pale cross on chest).

examined with dark brown symmetrical markings between the supratympanic crests and the posterior part of the upper eyelids, that may have had a dark (e.g. ULABG 1924) or pale brown (e.g. ULABG 1319) border. Two infraocular dark brown bands present, separated by a paler band (sometimes cream-coloured, like CVULA 5119), although one of these bands (or both) may be inconspicuous (e.g. CIEZAH 322). Palpebral membrane dusted with brown, with a well defined dark brown border.

Upper part of flanks same as dorsum; lower part paler, similar to coloration of venter. Extremities, above, generally with dark brown bars on pale brown background; in some instances (e.g. CIEZAH 317-318), the bars are not well-defined. Ventral aspect of hindlimbs immaculate cream. Ventral aspect of forelimbs longitudinally bicoloured (internal half, cream; external half, brown); a dark brown line present from palmar tubercle to almost the elbow. Palms dark-brown, but less than soles, which are the darkest ventral surfaces. Lateral fringe on toe IV made up of tubercles paler than those on top of digit.

Throat and chest usually marbled with brown; border of lower mandible inconspicuously marbled. Anterior part of chest and gular region somewhat darker in CIEZAH 317. Venter usually marbled (most specimens bearing dispersed pale brown specks on a cream background) to completely pale gray (e.g. CIEZAH 318-319). Lower venter, between groin and cloacal region, immaculate cream. A pale-cream cross usually present on chest (conspicuous in CIEZAH 319 and 322 and in CVULA 1319; inconspicuous in CIEZAH 317, ULABG 1924 and CIEZAH 323). The longitudinal line of this pale-cream cross extends from base of throat to middle of the venter; the transversal line connects insertions of arms.

BIOGEOGRAPHY

Confusion of *Bufo sternosignatus* with other taxa brought misconceptions about the distribution of the species, that at times has been thought to occur in Central America and Colombia (e.g. BOULENGER, 1882), Mexico (LUTZ, 1927a), and even in "the Guianas, rarely extending farther southwards in eastern Brazil" (PARKER, 1935: 528). Central American records probably belong to *Bufo valliceps* and *Bufo typhonius alatus*. Colombian, Guianan and Brazilian records probably correspond to some other forms in the "typhonius complex". Venezuelan records in the literature for *Bufo sternosignatus* include mostly specimens from the Cordillera de La Costa: thus, those from Estado Carabobo include Puerto Cabello (GÜNTHER, 1859, BOULENGER, 1882), Río La Mona and San Esteban ("Río Loma" and "San Esteban trail to Las Cuiguas", respectively, according to UMMZ lists), between Valencia and Caserío Silva ("Palma Sola" in UMMZ lists) and Río Bejuma (RIVERO, 1961). From Estado Aragua they include Maracay (SOLANO, 1969) and Rancho Grande (RIVERO, 1961).

Other literature records include: (1) the Distrito Federal: Caracas (BOETTGER, 1892; SOLANO, 1969), Mamo, near La Guaira (LUTZ, 1927a-b, 1955), El Limón, Carayaca and Cerro Avila (RIVERO, 1961); (2) the Estado Falcón: Distrito Acosta, Cerro Cosme, Pauji (SHREVE, 1947; RIVERO, 1961); (3) the Estado Portuguesa: La Aparición, between ríos Are

and Guache (RIVERO, 1961, 1964a). New records for Estados Barinas, Carabobo, Falcón, Portuguesa, and Trujillo, in Venezuela, are listed above.

Populations of the species from the Falcón region of Venezuela, Cordillera de La Costa and Cordillera de Mérida may currently be isolated from each other by the Yaracuy Depression and some low xerophytic passes. The areas they currently occupy may be the product of a formerly wider distribution during previous warmer interglacial periods of the Quaternary (in which humid forests of all three mountain ranges may have had a more continuous coverage), and its subsequent humid forest breakdown in drier periods (like glacial episodes). Many areas in the Lara-Falcón mountain system are good prospective places where to look for the species. The distribution of *B. sternosignatus* southward reaches Barinitas, in the Los Llanos versant of the Cordillera de Mérida; it may be expected from similar environments down to the Táchira Depression.

Bufo sternosignatus has been reported from elevations of 150 m (ULABG 3947; see above) to 1800 m (precise specimen and locality not stated, in FROST, 1985), in humid premontane forests ("Bosque húmedo premontano" and "Bosque muy húmedo premontano", in the Holdridge's Life Zone System for Venezuela of EWEL et al., 1976). Most of the original vegetation in these environments is lost, specially due to its having been turned into coffee and cacao plantations. The mean annual precipitation of these forests ranges from 1100 to 4000 mm, with water balance favourable during most part of the year, although in the Cordillera de La Costa a short dry period occurs (EWEL et al., 1976). In places with a strong seasonal precipitation (like some forests in the Cordillera de La Costa), populations of *Bufo sternosignatus* may behave as explosive breeders. *Bufo sternosignatus*, like some other species associated with humid premontane forests (e.g. *Mannophryne* spp., see LA MARCA, 1992b, 1993, 1994a-b), is most probably restricted to areas with temperatures between 18 and 24°C. Temperatures away from this range may constitute a physiological hindrance to the species, because more than 24°C increases the evapotranspiration rate and less than 18°C increases the probability of frost (EWEL et al., 1976), thereby resulting in topoclimatic changes that may be adverse to these amphibians. No ecological data have been gathered on the species, and our only data on prey items comes from MCNG 2191 and ULABG 2940, which contained ants and beetles (some Curculionidae).

RESUMEN

En este trabajo proveemos una redescrición de *Bufo sternosignatus*, un sapo pequeño del noroeste de Venezuela generalmente asociado con el "grupo de *B. typhonius*", y datos detallados sobre morfología externa, piel, datos merísticos, patrón de coloración de animales vivos y preservados, y biogeografía

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Corresponding editor: Jaime PÉFAUR.